

OXC-3155
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6 March 1962
#136-001

Dear Gene,

Re: Oxcart Proposal

A reasonable period has elapsed since you received our latest technical proposal for the F-Model and I wanted to take this opportunity to explain some of the changes in approach that you found described in the text. The major differences between the prototype flyable breadboard and the F-Model proposal lie in the following areas.

1. Start-stop platen
2. Direction of scan
3. IMC Method
4. Data System

I might emphasize that with more knowledge of the overall problems, and with the experience gained from prototype testing, changes are to be expected and we would be remiss if past experience were not applied to future designs. Let's examine each area separately.

The early design of a continuous platen and intermittent film motion has been demonstrated to be satisfactory in the prototype and it minimizes disturbing torque impulses due to an intermittent platen. However, it does produce an auxiliary problem of dirt build up on the platen after many feet of material have been transported. This is not necessarily external dirt resulting from unclean surroundings, but rather is mainly scrappings from the base side of the film accumulating from the small slippage that exists at the start and stop of each frame. The problem can be controlled by cleaning at the end of each mission, but we feel the overall system reliability would be higher if the slippage were minimized. This can be accomplished by starting and stopping the platen for each frame and maintaining the film platen contact at all times. Analysis shows the platen inertia to be small compared with that of the mirror and the resulting torque impulse will not be serious, particularly in the light of the second basic change.

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You will recall that the P-Model swept both A & B mirrors in the same direction at the same time. This appeared ideal from the coverage standpoint, but was of course a large disturbance to the stabilized platform. The new proposal suggests mirrors that pan simultaneously in opposite directions, i.e. the A goes from left to right and the B from right to left. This will minimize the disturbance to the stable platform and effect an overall economy in the muscles and power required for stabilization. It also permits the A & B units to be practically identical, rather than mirror images. The disadvantage is that any given location, say 5° left of nadir, is covered early in the frame of one camera and late in the frame of the other. This produces some variation in the B/H from one end of a frame to the other. To date we have found this to cause no major difficulty in viewing or interpretation, but we would appreciate the comments of other interpreters on this type of stereo format.

IMC in the prototype is accomplished, as you recall, by a slight rotation of a mirror assembly in the short conjugate side of the lens. The same motion can be accomplished by a small rotation of the panning mirror about an axis orthogonal to the panning axis. Either technique accomplishes the same result. The compound motion of the panning mirror took somewhat longer to analyze but the solution is now available, and it permits some reduction in the total number of reflecting surfaces with a corresponding increase in transmission.

The fourth area of major difference is the data system for which the proposal assumes the use of a magnetic tape recorder. Although this approach has some obvious technical advantages, we have no concrete assurance that it is the system to be adopted. As stated in the proposal, we will be prepared to implement whichever data technique is chosen for system use.

This concludes the summary of major changes. All other technical approaches are basically the same as those in the prototype. The configuration and appearance will of course be somewhat different. The prototype was essentially a flying breadboard and was not designed for minimum weight or maximum serviceability.

I recognize that the explanations above contain little design detail. Should you have additional questions on the concepts involved we would be happy to discuss them, perhaps when you visit us in the near future.

E.L.G.

cc: J.L.B.
C.F.H.
A.B.S.
E.L.G.